Complete Summary

GUIDELINE TITLE

Amblyopia.

BIBLIOGRAPHIC SOURCE(S)

American Academy of Ophthalmology Pediatric Ophthalmology/Strabismus Panel. Amblyopia. San Francisco (CA): American Academy of Ophthalmology; 2007. 28 p. [110 references]

GUIDELINE STATUS

This is the current release of the guideline.

It updates a previous version: American Academy of Ophthalmology Pediatric Ophthalmology Panel. Amblyopia. San Francisco (CA): American Academy of Ophthalmology; 2002 Oct. 25 p. [113 references]

All Preferred Practice Patterns are reviewed by their parent panel annually or earlier if developments warrant and updated accordingly. To ensure that all Preferred Practice Patterns are current, each is valid for 5 years from the "approved by" date unless superseded by a revision.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Amblyopia including:

- Amblyopia, unspecified
- Strabismic amblyopia (suppression)

- Deprivation amblyopia
- Refractive amblyopia, including anisometropic and isometropic amblyopia

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Prevention
Screening
Treatment

CLINICAL SPECIALTY

Family Practice
Ophthalmology
Pediatrics

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Plans
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To prevent or reverse vision impairment caused by amblyopia while addressing the following goals:

- Identify children at risk for esotropia
- Examine and diagnose the child with amblyopia or risk factors for amblyopia at the earliest possible stage
- Identify etiology of amblyopia and formulate an appropriate treatment plan
- Inform the family/caregiver of the diagnosis, treatment options, and care plan
- Inform the primary care provider of the diagnosis and treatment plan and collaborate on ongoing care
- Treat infants and children with amblyopia in order to improve visual acuity, facilitate the treatment of strabismus, and reduce the likelihood of vision-related disability
- Limit the effect of amblyopia treatment on quality of life
- Lessen the effect of amblyopia on employment and career choices
- Re-evaluate the patient and adjust the treatment plan as necessary

TARGET POPULATION

Children with amblyopia or at risk for amblyopia

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. History
2. Examination
    - Assessment of visual acuity and fixation pattern
    - Ocular alignment and motility
    - Red reflex/binocular red reflex (Brückner) test
    - Pupil examination
    - External examination
    - Anterior segment examination
    - Cycloplegic retinoscopy/refraction
    - Funduscopic examination
    - Binocularity/stereoacuity testing

Management/Treatment

1. Optical correction
2. Occlusion therapy
3. Penalization with cycloplegics (atropine, homatropine, or cyclopentolate) or by altering the refractive correction of the dominant eye
4. Surgery
5. Follow-up evaluation during treatment
6. Counseling and referral

MAJOR OUTCOMES CONSIDERED

- Degree of visual acuity improvement obtained after treatment
- Side effects or complications of treatment of amblyopia

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

In the process of revising this document, a detailed literature search of Medline and the Cochrane Library for articles in the English language was conducted on the subject of amblyopia for the years 2001 to 2006.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Strength of Evidence Ratings

Level I: Includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analyses of randomized controlled trials.

Level II: Includes evidence obtained from the following:

- Well-designed controlled trials without randomization
- Well-designed cohort or case-control analytic studies, preferably from more than one center
- Multiple-time series with or without the intervention

Level III: Includes evidence obtained from one of the following:

- Descriptive studies
- Case reports
- Reports of expert committees/organization (e.g., Preferred Practice Patterns [PPP] panel consensus with external peer review)

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The results of a literature search on the subject of amblyopia were reviewed by the Pediatric Ophthalmology/Strabismus Panel and used to prepare the recommendations, which they rated in two ways. The panel first rated each recommendation according to its importance to the care process. This "importance to the care process" rating represents care that the panel thought would improve the quality of the patient´s care in a meaningful way. The panel also rated each recommendation on the strength of the evidence in the available literature to support the recommendation made.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Ratings of Importance to Care Process

Level A, defined as most important

Level B, defined as moderately important

Level C, defined as relevant, but not critical

COST ANALYSIS

One cost-utility analysis was reviewed. This analysis showed that early detection and treatment of amblyopia are highly cost-effective when compared with other interventions in health care.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

These guidelines were reviewed by Council and approved by the Board of Trustees of the American Academy of Ophthalmology (September 8, 2007).

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Ratings of importance to the care process (A-C) and ratings of strength of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Diagnosis

The initial amblyopia evaluation (history and physical examination) includes all components of the comprehensive pediatric ophthalmic evaluation (American Academy of Ophthalmology Basic and Clinical Science Course Subcommittee, 2007), with special attention to the potential risk factors for amblyopia, such as a positive family history for strabismus, amblyopia, or media opacity.

History

Although a thorough history generally includes the following items, the exact composition varies with the patient's particular problems and needs:

- Demographic data, including identification of parent/caregiver, and patient's gender and date of birth [A:III]
- Documentation of identity and relationship of historian [B:III]
- The identity of other pertinent health care providers [A:III]
- The chief complaint and reason for the eye evaluation [A:III]
- Current eye problems [A:III]
- Ocular history, including prior eye problems, diseases, diagnoses, and treatments [A:III]

- Systemic history; birth weight; prenatal and perinatal history that may be pertinent (e.g., alcohol, tobacco, and drug use during pregnancy); past hospitalizations and operations; and general health and development [A:III]
- Current medications and allergies [A:III]
- Review of systems [B:III]

Examination

The eye examination consists of an assessment of the physiological function and the anatomic status of the eye and visual system. Documentation of the child's level of cooperation with the examination can be useful in interpreting the results and in making comparisons among the examinations over time. In general, the examination may include the following elements:

- Assessment of visual acuity and fixation pattern [A:III]
- Ocular alignment and motility [A:III]
- Red reflex or binocular red reflex (Brückner) test [A:III]
- Pupil examination [A:III]
- External examination [A:III]
- Anterior segment examination [A:III]
- Cycloplegic retinoscopy/refraction [A:III]
- Funduscopic examination [A:III]
- Binocularity/stereoacuity testing [A:III]

Management

Success rates of amblyopia treatment may decline with increasing age (Scheiman et al., 2005; Mohan, Saroha, & Sharma, 2004) [A:I]. However, all children should be considered for treatment of amblyopia regardless of age although the difficulty of treatment for both the patient and caregiver should not be underestimated (Dixon-Woods, Awan, & Gottlob, 2006; Yang & Lambert, 1995; Koklanis, Abel, & Aroni, 2006). The prognosis for attaining and maintaining essentially normal vision in an amblyopic eye depends on many factors, including the age of the patient at detection, the cause and severity of amblyopia, the history of previous treatment (Scheiman et al., 2005), the duration of amblyopia, and compliance with treatment.

The following therapies are used alone or in combination as required to achieve the therapeutic goal.

- Optical correction (Scheiman et al., 2005; Chen et al., 2007; Cotter et al., 2006) [A:I]
- Occlusion (Repka et al., 2005; Pediatric Eye Disease Investigator Group, 2002; Pediatric Eye Disease Investigator Group, "A comparison," 2003; Repka et al., 2003) [A:I]
- Penalization (Repka et al., 2005; Pediatric Eye Disease Investigator Group, 2002; Pediatric Eye Disease Investigator Group, "A comparison," 2003; Repka et al., 2004; Pediatric Eye Disease Investigator Group, "The course of moderate amblyopia," 2003) [A:I]
- Surgery to treat the cause of the amblyopia (Lam, Repka, & Guyton, 1993; Paysse et al., 2006; Reese & Weingeist 1987) [A:III]

In general, occlusive adhesive patches should be used during the initial therapy in many cases of amblyopia [A:III]; however, in mild to moderate amblyopia, penalization with atropine drops has been shown to be an effective alternative (Repka et al., 2005; Pediatric Eye Disease Investigator Group, 2002; Pediatric Eye Disease Investigator Group, "A comparison," 2003; Repka et al., 2004; Pediatric Eye Disease Investigator Group, "The course of moderate amblyopia," 2003)

Follow-up Evaluation during Treatment

The purpose of the follow-up evaluations is to monitor the response to therapy and adjust the treatment plan as necessary. Follow-up evaluation includes interval history and tolerance to therapy with appropriate examinations and testing as indicated.

The frequency of follow-up evaluations will depend on the age of the patient, severity of the amblyopia, and intensity of occlusion therapy (high versus low percentage).

Patients who are functionally monocular should wear proper protective eyewear full time, even if they do not require corrective lenses [A:III]. A frame approved by the American National Standards Institute Standard No. Z87.1 with polycarbonate lenses should be worn for daily wear and low-eye-risk sports [A:III]. For most ball and contact sports, polycarbonate sports goggles should be worn, and head and face protection should be added for higher risk activities (American Academy of Pediatrics and American Academy of Ophthalmology, 2003; Vinger, 1998) [A:III]. Functionally monocular individuals should use approved protective eyewear when participating in contact sports or other potentially harmful activities, such as those that involve pellet guns, paintballs, and personal use of fireworks (Saunte & Saunte, 2006; Kennedy, Ng, & Duma, 2006; Endo, Ishida, & Yamaguchi, 2001; Fleischhauer et al, 1999; Greven & Bashinsky, 2006; Listman, 2004; Hargrave, Weakley, & Wilson, 2000) [A:III]. Special goggles, industrial safety glasses, side shields, and full-face shields should be used in these cases [A:III]. Functionally monocular patients should be aware of the need to have regular eye examinations throughout their lives [A:III].

Counseling and Referral

Amblyopia is a long-term problem that requires commitment from the parent/caregiver and ophthalmologist to achieve the best possible outcome.

The ophthalmologist should discuss the findings of the evaluation with the patient, when appropriate, as well as the parent/caregiver [A:III]. The ophthalmologist should explain the disorder and recruit the family in a collaborative approach to therapy [A:III]. Parents/caregivers of pediatric patients who understand the diagnosis and rationale for treatment are more likely to adhere to treatment recommendations (Newsham, 2002; Norman et al., 2003)

Table. Recommended Amblyopia Follow-Up Evaluation Intervals During Active Treatment Period [A:III]

Patient Age (years)	High-Percentage Occlusion (70% or more of waking hours/≥6 hours per day)	Low-Percentage Occlusion (<70% of waking hours/<6 hours per day) Penalization	Maintenance Treatment or Observation
0-1	1-4 weeks	2-8 weeks	1-4 months
1-2	2-8 weeks	2-4 months	2-4 months
2-3	3-12 weeks	2-4 months	2-4 months
3-4	4-16 weeks	2-6 months	2-6 months
4-5	4-16 weeks	2-6 months	2-6 months
5-7	6-16 weeks	2-6 months	2-6 months
7-9	8-16 weeks	3-6 months	3-12 months

Note: These follow-up intervals were generated by panel consensus.

Definitions:

Ratings of Importance to the Care Process

Level A, defined as most important

Level B, defined as moderately important

Level C, defined as relevant but not critical

Ratings of Strength of Evidence

Level I: Includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analyses of randomized controlled trials.

Level II: Includes evidence obtained from the following:

- Well-designed controlled trials without randomization
- Well-designed cohort or case-control analytic studies, preferably from more than one center
- Multiple-time series with or without the intervention

Level III: Includes evidence obtained from one of the following:

- Descriptive studies
- Case reports
- Reports of expert committees/organization (e.g., preferred practice patterns [PPP] panel consensus with external peer review)

CLINICAL ALGORITHM(S)

A clinical algorithm is provided in the original guideline document for "Management of Amblyopia."

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for selected recommendations (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Early identification and treatment of children at risk for amblyopia may prevent or reverse vision impairment caused by amblyopia.
- Successful treatment of amblyopia improves visual acuity and lessens the effect of amblyopia on employment and career choices.
- Amblyopia treatment is an important step in the correction of strabismus, and good vision in each eye may maintain alignment of the eyes, thereby reducing the need for repeat surgery.

POTENTIAL HARMS

- Children treated with full-time or near full-time occlusion may develop strabismus or occlusion amblyopia in the previously better-seeing eye. Other side effects of treatment are well known and usually mild and transient (e.g., skin irritation). Children wearing a patch should be monitored carefully to avoid accidents.
- Atropine should be used with caution during the first year of life because of systemic side effects and the possibility of blur-induced amblyopia. In a few cases, atropine has been associated with the development of strabismus.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- **Preferred Practice Patterns provide guidance for the pattern of practice, not for the care of a particular individual.** While they should generally meet the needs of most patients, they cannot possibly best meet the needs of all patients. Adherence to these *Preferred Practice Patterns* will not ensure a successful outcome in every situation. These practice patterns should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed at obtaining the best results. It may be necessary to approach different patients' needs in different ways. The physician must make the ultimate judgment about the propriety of the care of a particular patient in light of all of the circumstances presented by that patient. The American Academy of Ophthalmology is available to assist members in resolving ethical dilemmas that arise in the course of ophthalmic practice.
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IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm
Personal Digital Assistant (PDA) Downloads
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1992 Feb (revised 2007 Sep)

GUIDELINE DEVELOPER(S)

American Academy of Ophthalmology - Medical Specialty Society

SOURCE(S) OF FUNDING

American Academy of Ophthalmology without commercial support

GUIDELINE COMMITTEE

Pediatric Ophthalmology/Strabismus Panel; Preferred Practice Patterns Committee

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Members of the Pediatric Ophthalmology/Strabismus Panel: Linda M. Christmann, MD, Chair; Patrick J. Droste, MD; Sheryl M. Handler, MD, American Association for Pediatric Ophthalmology and Strabismus Representative; Richard A. Saunders, MD; R. Grey Weaver, Jr., MD; Susannah G. Rowe, MD, MPH, Methodologist; Norman Harbaugh, MD, FAAP, American Academy of Pediatrics Representative; Donya A. Powers, MD, American Academy of Family Physicians Representative

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

This author has disclosed the following financial relationships from January 2006 to August 2007:

Norman Harbaugh, MD, FAAP: Kids First – Grant support. Kids Time – Equity owner. Medimmune – Lecture fees. Centers for Disease Control, Merck, United Healthcare – Consultant/Advisor.

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GUIDELINE AVAILABILITY

Electronic copies: Available from the American Academy of Ophthalmology (AAO) Web site.

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Summary benchmarks for preferred practice patterns. San Francisco (CA): American Academy of Ophthalmology; 2007 Nov. 22 p.

Available in Portable Document Format (PDF) and as a Personal Digital Assistant (PDA) download from the American Academy of Ophthalmology (AAO) Web site.

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 1, 1998. The information was verified by the guideline developer on January 11, 1999. This summary was updated on March 12, 2003. The updated information was verified by the

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